THE PILOT STAFFING CONUNDRUM: A DELPHI STUDY

GRADUATE RESEARCH PAPER

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Abstract

In this study sponsored by HQ USAF/A1PP, 23 MAJCOM/FOA rated management experts were surveyed. In a three round Delphi Study, the expert panel determined a list of unique pilot knowledge, skills, and abilities (KSAs) and staff issues that benefited from those KSAs. The value of this study is that it highlights a conundrum in pilot manning that is exacerbated by current trends in budget and manning reductions. Traditionally, the AF wants and needs pilots in some staff positions because of unique KSAs, and in other positions to develop future leaders. Currently, the Air Force can no longer afford to fill even the most essential positions, much less those positions which further career development, and meet increasing operational requirements.

The impact of this study is that it underscores the importance of a concrete understanding of pilot staff requirements and supports a requirements review of all 3,005 pilot staff positions. It also demonstrates that the Air Force should discuss what it expects future leaders to look like. Are pilots part of the future leadership of the Air Force or not? If so, how will anticipated staff reductions affect force development? While this study does not make recommendations for specific staff reductions, it does address a critical supply/demand issue (for pilots, specifically on staff) from a demand-side perspective where most past efforts have concentrated on the supply side of the equation.

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Meg Martin

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Introduction

The impetus for this study is the widespread sense in the Air Force that there are not enough pilots to go around. The Air Force's inability to fully man critical staff positions while maintaining operational and training cockpits results in a difficult conundrum, one which HQ USAF/A1PP was interested in solving. In an effort to investigate the pilot supply/demand mismatch, particularly as related to staff positions, this study surveyed 23 rated management experts in a three-round Delphi Study.

The guiding research question for this study was, "Do USAF staff positions require pilots?" From this broad question, several investigate questions were fine-tuned to seek a consensus from the expert panel on the knowledge, skills, and abilities (KSAs) pilots develop during flying assignments and how those KSAs are relevant to staff positions. From there, a discussion of where and why pilots should serve on staffs evolved. The intent of this study is to further the understanding of rated staff requirements and add to the body of knowledge surrounding pilot inventory and requirements.

Current Situation

The most recent demographics published by the Air Force personnel center show that as of 31 December 2008 there are 13,246 pilots in the grades of lieutenant colonel and below in the Air Force (AFPC, 2009). In total, there are 18,674 rated officers in the grades of lieutenant colonel and below (AFPC, 2009). The shape of the rated force has changed in the last few years with 777 rated officers leaving the Air Force in FY 06-07 under force shaping initiatives. While that draw down in and of itself is not worrisome, an unanticipated increase of roughly 1,666 requirements during FY08-09 has placed a stress on the rated force to fill all of its operations and

training cockpits and still have enough rated officers to fill staff requirements (HQ USAF A3O-AT, Dec 2008b).

The requirement for operations and training positions is 15,904. Current projections show a fill rate of 96% overall or 15,360 entitlements (HQ USAF A3O-AT, Dec 2008b). The FY09 Rated Staff Allocation Plan estimates that there are 4,776 rated staff requirements (HQ USAF A3O-AT, Dec 2008b). To man all requirements to one hundred percent, the Air Force would require 20,680 rated officers in the grade of lieutenant colonel and below, exceeding the current force size by nearly 2,000 officers. Clearly, the Air Force is short of rated officers.

The current requirement for pilots in staff positions is 3,005 (HQ USAF A3O-AT, Dec 2008b). Using RAND Project Air Force data and categorizing pilots into four groups described in AFI 11-412 (Force, Training, Test, and Other), reveals a severe obstacle for filling those 3,000 requirements (RAND, 2009). RAND analysts estimate that there are a total of 13,249 rated requirements with only 11,519 bodies in the usable inventory (RAND, 2009). Depending on how the inventory is distributed (100% fill for Force only versus 100% fill for Force, Training, and Test), staff manning could be left anywhere from 1,171 to 2,065 officers short (RAND, 2009). A 33% staff fill is close to what the FY09 RSAP proposes with only 814 pilot entitlements projected (HQ USAF A3O-AT, Dec 2008b).

History

This is not the first time the Air Force has experienced a pilot shortage. In post-war draw downs following both World War II and the Korean War, the Air Force found itself undermanned for subsequent conflicts. In both instances, an increase in pilot production fixed the shortages. Similarly, following the Vietnam Conflict, by FY 79 the Air Force experienced a 1,329 pilot deficit. Again, the 5.5% shortfall was quickly remedied by an increase in pilot

production (Ballard, 1998). In the 1980s, the anticipated shortage at the end of the decade was mitigated by the peacetime cuts following the fall of the Soviet Union. Ultimately, the AF experienced a 583 pilot deficit (2.7%) in FY 90 (Ballard, 1998). Throughout the 1990s, the Air Force experienced a leveling of requirements at approximately 14,000 pilots and reduced pilot production in the early part of the decade to an all-time low of 480 in FY 95 (Ballard, 1998). While this dip in production yielded a slight surplus early on, Air Force Personnel Center analysts projected a 2,341 pilot shortage by FY 02 (Ballard, 1998).

While a shortage did in fact come to pass, it was not the factors projected by analysts in the late 1990s (tempo, airline hiring, pay) that most shaped the force of the twenty-first century. Pilot manning in the 2000s was most shaped by the events of 9/11, PBD-720, and the requirements generated by the subsequent War on Terror. As mentioned earlier, the rated force decreased by 777 in FY 06-07 as part of PBD-720 initiatives. A greater contributor to the current pilot shortage, however, is the nearly 1,700 additional requirements added in FY 08-09. While that is a total for additional rated requirements, there are clearly some pilot specific billets—the United States Air Force Academy Powered Flight, NATO C-17s, increased Introduction to Fighter Fundamentals and Initial Flying Screening requirements, the Unmanned Aircraft Systems (UAS) Programmed Flying Training, Joint Strike Fighter initial cadre, and MC-12 aircraft—which increase pilot requirements by over 650 (HQ USAF A3O-AT, Dec 2008b).

Since the 1970s, the Air Force has devoted energy to managing rated issues with a formal rated management process. The earliest efforts began in 1973 when the Air Staff recognized the need for a formalized process (HQ USAF A3O-AT, Mar 2009). By 1975, The CSAF approved the Rated Distribution and Training Management (RDTM) concept. The RDTM system projected average annual flying training requirements for a 50 year period. From there,

subcommittees met twice annually to match inventory to requirement, or supply to demand. The RDTM teams matched Undergraduate Flying Training (UFT) production rates and distribution into Major Weapons System (MWS) training (HQ USAF A3O-AT, Mar 2009a).

Experience and Absorption

The post-Vietnam era saw the inception of two different initiatives, the Rated Managements Initiatives Group (RMIG) and the Rated Management Planning Group (RMPG). The RMIG was designed to oversee the force in order to maintain reasonable levels of experience and stability in a declining force. The RMPG was created in 1979 in response to projected shortfalls. The RMPG strategy was to protect force and training authorizations at the expense of staff and rated supplement (non-flying assignments designed for career broadening) positions. With the normalization of airline hiring in the 1980s and the stabilization of the rated force, projected shortfalls did not materialize so rated prioritization plans were deemed unnecessary and shelved until the end of the decade (HQ USAF A3O-AT, Mar 2009a).

Rated management efforts in the early 1980s focused on absorption. Absorption is the term used by rated managers to define the number of new pilots introduced into a weapons system each year (HQ USAF A3O-AT, Mar 2009b). In the early 1980s, the challenge was to determine how to absorb enough pilots into the limited number of cockpits to sustain the total requirement (HQ USAF A3O-AT, Mar 2009a). By the mid 1980s, the attention of rated management experts had shifted from absorption to retention. With absorption limits pressed as far as possible, the Air Force had to find another way to address long-term stability. In an effort to retain pilots, active duty service commitments (ADSCs) for pilot training were extended, academic training and simulator instructors jobs were contracted out to civilian companies, the Chief of Staff of the Air Force (CSAF) authorized reduction of the rated supplement, and the

monetary incentives for fliers (Aviation Career Incentive Pay and Aviator Continuation Pay) were improved. By then end of the 1980s, the Air Force returned to rated prioritization plans (HQ USAF A3O-AT, Mar 2009a).

Force Reduction

Concerns over the anticipated shortage of the 1990s were replaced by the need to manage with directed cuts in the force structure following the fall of the Berlin Wall. Additionally, rated management issues were put on hold in order to execute Operations DESERT SHIELD/DESERT STORM. However, forces were in motion (closing units, steady UPT production) to create a situation where young, inexperienced pilots outnumbered available cockpits. To address the issue in the early 1990s, the CSAF attempted to cut pilot production. Congress overrode the CSAF and created a situation where new entrants were backlogged and new pilots were "stacked"; awaiting training at Formal Training Units (FTU) and entrance to operational units. To address this problem, in 1991, the CSAF authorized a program to "bank" pilots. Under this program, new pilots were sent to other career fields for up to 2 years and 10 months. Furthermore, pilots were made eligible for end-strength reduction programs like the Pilot Early Release Program (PERP) and by 1994, the Air Force was at a historic low for annual pilot production. The historically low production rates of the early 1990s produced a bathtub effect in year-group demographics that analysts expected to impact Air Force pilot manning through at least 2015 (HQ USAF A3O-AT, Mar 2009a).

The irony of the situation was that by March 1994, as pilot production was hitting a historic low, the Air Force began to project severe shortages. The CSAF terminated incentivized pilot exit programs, approved a 20 percent cut in staff positions, and increased pilot production to up to 1,050 by FY 01. The 1996 Aircrew Management Summit (AMS) brought together the

CSAF and commanders from every Major Command (MAJCOM), Air National Guard (ANG), and Air Force Reserve Command (AFRC), as well as HQ USAF/XO/RE/DP (HQ USAF A3O-AT, Mar 2009a). This one day summit was used to address the then current situation of Air Force rated manning as well as the path that led to the situation. Many steps were taken to reverse the downward trend in the pilot inventory, but it was felt that there was more work to be done in the area of production capability.

Events in the later part of the decade further contributed to rated management issues. The 1997 Quadrennial Defense Review (QDR) postponed the pilot staff cuts previously ordered by the CSAF. Production was also affected as the QDR directed the closing of Reese AFB, one of the Air Force's Undergraduate Pilot Training (UPT) bases. Additionally, the US economy in at the end of the decade appeared strong and growing; airline demand for military pilots was projected to grow well into the next century. As a result, there was a coordinated effort between the Air Staff, MAJCOM rated managers, and the Air Force Personnel Center (AFPC) to return to the use of a viable Pilot Prioritization Plan (HQ USAF A3O-AT, Mar 2009a).

Rated Management

Although the last formal Aircrew Manning Document was published in 1997, there has been continuous effort to more deliberately manage pilot manning. Ongoing initiatives for aircrew management include the Aircrew Management Executive Council (AMEC), whose responsibilities are described in AFI 11-412. The AMEC is comprised of colonel and below aircrew managers from operations and personnel communities and is the key forum for Air Staff and MAJCOMs to discuss and review policy and plans (AFI 11-412, 2005). Manpower requirements and rated allocation are two key issues under the purview of the AMEC (AFI 11-412, 2005). The AMEC is aligned specifically to inform and influence Air Force leadership to

prevent disconnects such as the mid-1990s UPT production levels. In addition Air Force senior leadership has convened periodically to address rated issues, meeting at the Rated Summit in 1999 and 2001, the 2005 Aircrew Review, and the 2008 Rated Management Conference (Ingram, Mar 2009a). The summits in 1999 and 2001 both dealt with pilot shortages and shifted from a strictly pilot focus in 1999, to a more inclusive rated approach, as the 2001 summit included navigators, electronic warfare officers, and air battle managers (HQ USAF A3O-AT, Mar 2009a).

Between 1997 and 2008, the Air Force also launched two task forces intended to be a comprehensive and holistic "reboot" of Aircrew Management issues—the Rated Management Task Force (RMTF) in 1998 and Transformational Aircrew Management Initiatives for the 21st Century (TAMI-21) in 2006 (Ingram, Mar 2009a). The RMTF focused on reducing requirements, optimizing absorption, maximizing retention, and aggressively managing the rated force—recommendations that led to the 1999 Rated Summit (HQ USAF A3O-AT, Mar 2009a). TAMI-21 was intended to account for force structure changes of the mid-2000s that caused imbalances in pilot inventory distribution and enact programs to ensure inexperienced pilots receive training thereby preserving readiness levels (Randolph, 2007).

The Long Blue Line

The most recent Air Force effort is the 2008-09 Integrated Process Team (IPT) chaired by the Air Force Vice-Chief of Staff. The IPT mission is to adjust rated requirements to achieve balance with the inventory over the next 5-10 years and to develop policy and processes that maintain that balance (HQ USAF A3O-AT, Feb 2009). To visualize the potential mismatch between requirements and inventory, the IPT uses, among other sources, current Redline/Blueline (RL/BL) information. Redline/Blueline charts are prepared semi-annually and

are used to requirements and inventory data to Air Force Senior Leaders and MAJCOMs. The Redline is the requirements line and includes all lieutenant colonel-and-below aircrew manpower authorizations, as well as man-year authorizations (e.g., for advanced students, PME, etc.) (AFI 11-412, 2005). The Blueline is the inventory line and includes all lieutenant colonel-and-below qualified aircrew members (AFI 11-412, 2005). A comparison of the October 2007 and September 2008 RL/BL is provided in Figure 1.

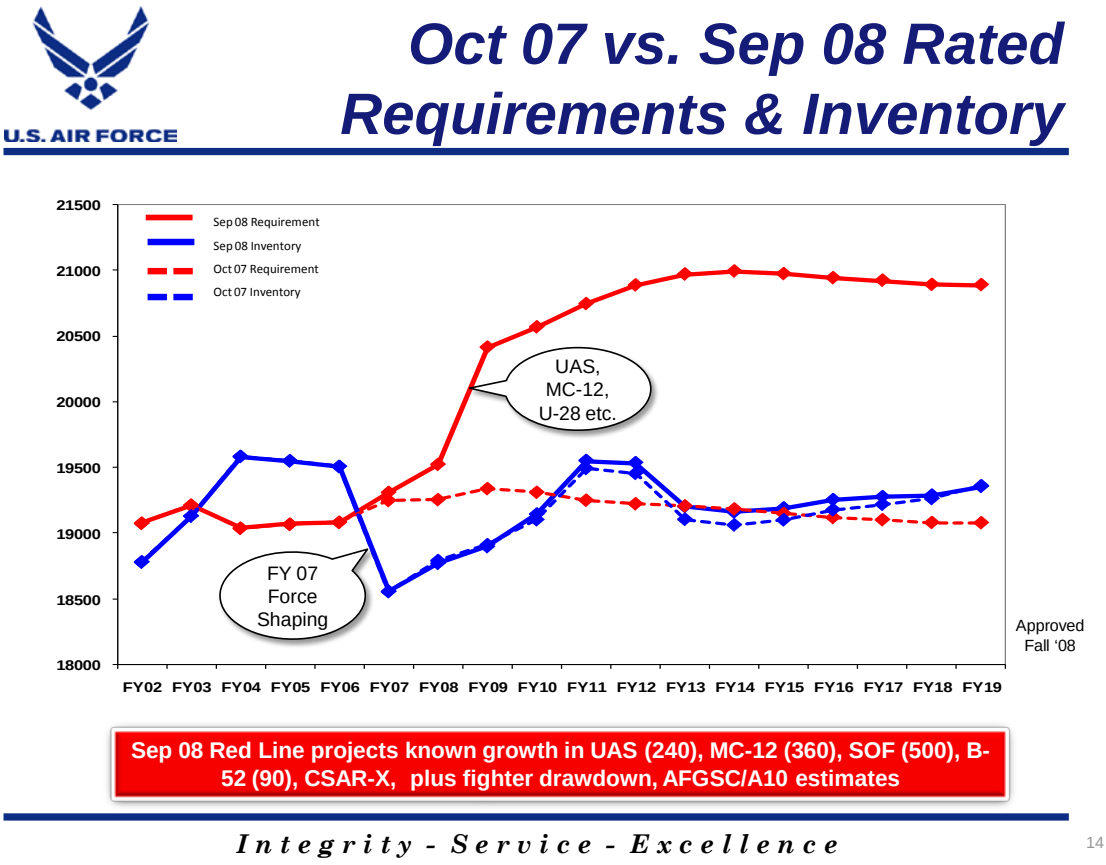

Figure 1. IPT RL/BL Data (HQ USAF A3O-AT, Feb 2009)

Initial IPT recommendations include the recategorization of more than 800 current rated staff requirements, although the criteria for identifying those positions are not available at this time. Final recommendations are projected for presentation to the CSAF at Corona Top in June 2009.

This focus on requirements marks a departure from past concentration on accessions and retention.

Literature Review

In addition to internal Air Force efforts to study rated management, there is a wealth of literature dealing with Rated Staff issues beginning in the 1980s through present day. In 1989, Lt Col Larry Magnusson explored the future of the Air Force navigator. In the late 1980s, the Air Force estimated pilot shortages in the amount of 2,500 pilots by 1993 (Magnusson, 1989). While the focus of Magnusson's research is the future of the Air Force navigator, he tangentially explores two topics related to this research. First, the navigator is often used as an alternative to pilots for manning jobs which require aviation experience. Magnusson concludes that opportunities for navigators to serve in command and staff positions increases as pilot manning suffers shortages (Magnusson, 1989). The first of two issues at hand, then, is filling rated requirements, the demand question. Magnusson offers an alternate supply mechanism: the navigator. Second, in highlighting increased opportunities for navigators on staff, essentially as pilot substitutes, Magnusson exposes the question of which jobs really require a pilot. Are some requirements filled equally by pilot or navigator? If so, then is the pilot staff requirement really as high as it appears to be?

The 1994 RAND report, "A Critical Assessment of Total Force Pilot Requirements, Management, and Training" was requested by the Undersecretary of Defense for Personnel and Readiness and the Assistant Secretary of Defense for Reserve Affairs at a time when the Air Force was faced with a pilot shortage during the midst of a force drawdown (Thie et al, 1994). Specifically, Thie and his colleagues (1994) considered pilot requirements in the era of drawdown and restructuring, the supply and sustainment of the pilot force, and the personnel

management and training policies. In examining requirements, they determined that Air Force projections of a force shortage were partially a result of Air Force databases not fully incorporating planned organizational changes; especially the staff organization (Thie et al, 1994). They do, however, provide five alternative policies to address requirements/inventory mismatches. Table 1 outlines the five proposed policies.

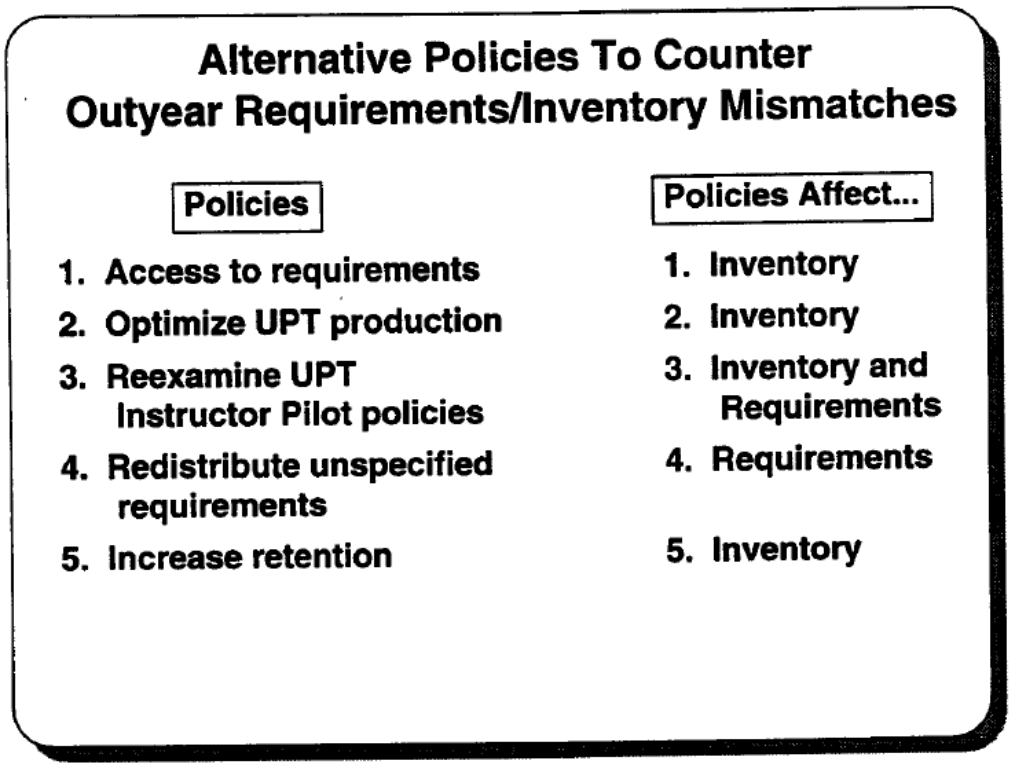

Table 1. RAND Policy Alternatives (Thie et al, 1994)

Although two of the alternatives address requirements, four of the policy solutions are geared toward inventory solutions; not uncommon from past Air Force trends of concentration on the supply side of pilot manning. Additionally, while the RAND study did not project the shortage to be as severe as the Air Force anticipated, it did recognize the real "bathtub" effect on certain year groups (FY 93-98). One long-term policy solution proposed to correct the "Bathtub" effect was a staff draw down to man crew ratio billets as a long term policy (Thie et al, 1994).

Requirements most often have often been balanced by accessions and/or retention (Thie et al, 1994). As a result, much of the Air Force's attention is spent on accessions and retention instead of reviewing requirements. Accessions, or pilot production, were determined by the sustainment model until the 1970s. The Air Force then adopted an absorption model until a lack of Permanent Change of Station (PCS) stability threatened retention numbers. By the mid-1980s, with retention on the rise, the Air Force transitioned to an Officer Volunteer Assignment System (OVAS) along with a vacancy-driven model of filling positions to manage pilot inventory (Thie et al, 1994). By the mid-1990s the OVAS, which emphasized the desires of individual officers, was replaced by the Officer Assignment System (OAS). The OAS was designed to balance officers' personal desires with professional development; and to ensure critical billets were filled (Hafer, 2007). The OAS was designed to balance commanders' inputs, individual officer's preferences, and the assignment officer's need to fill valid requirements with qualified officers (Hafer, 2007). These changes in the assignment system are another manifestation the Air Force's attempts to manage pilot inventories during the 1990s and beyond.

The Rated Management Primer from the 1998-99 timeframe (HQ USAF A3O-AT, Mar 2009b) illustrates the complexities of the absorption model and the supply side of pilot production. To increase fighter pilot inventory in the mid-1990s, the FY96 4-Star Aircrew Summit directed max-absorption to sustainment. Max-absorption to sustainment level is designed to grow inventory to support all requirements, but adversely impacts experience and stability, thereby lowering combat readiness (HQ USAF A3O-AT, Mar 2009b). The efforts to build the inventory were further thwarted by force structure changes reducing the number of available absorbable cockpits. (An absorbable cockpit is a flying assignment in an MWS that allows an inexperienced pilot to attain the experience level the Air Force recognizes for non-

flying assignments such as staff, and an important concept in the maturation of the pilot force.) The end result was that by the late 1990s, the max-absorption policy had devolved into over-absorption. Over-absorption puts an additional strain on the crew force because it leads to one of three situations: 1. Less than minimum acceptable experience during a desirable time-on-station; 2. Increased manning of experienced pilots to ensure unit reaches appropriate level of experience; 3. Increase hours per crew per month (HCM) which leads to shorter time-on-station and over-manning (HQ USAF A3O-AT, Mar 2009b). The impact of over-manning is not only increased requirements, but over-manning reduces HCM for inexperienced wingman, leading in effect, to shortages of experienced pilots (HQ USAF A3O-AT, Mar 2009b).

Pilot Retention

An additional stressor for pilot manning in the late 1990s was the issue of pilot retention. In one study, Kafer (1998) ties airline hiring practices to military pilot retention. His study concludes that airline hiring practices directly affect Air Force retention because the airlines pay more than the Air Force. For example, from 1988-1994, the Air Force provided 50% of new hires for the airlines (Kafer, 1998). In the 1980s, the airlines employed twice as many pilots as the Air Force and by 2000, the airlines were projected to employ five times as many (Kafer, 1998). The study concludes that the health and growth of the airline industry needs to be accounted for in Air Force pilot manning models.

An issue related to airline hiring practices is the Air Force policy of offering incentive pay (commonly called “the bonus”) to pilots in order to improve retention. Ballard (1998) compares the bonus take-rate high point (81%) of 1994 with tumbling numbers later in the decade—from 58% in 1996 to 26 % in 1998. The reduction in pilot retention was linked to airline demands that exceeded the number of military pilots eligible for separation, leading to a

stable hiring environment for former military pilots (Ballard, 1998). The study concludes that the pilot shortage of the 1990s was much more severe than the pilot shortage of the 1970s. To remedy retention and by extension, the anticipated pilot shortage, the author recommends implementing the Phoenix Aviator 20 program (designed to assist career military officer with the civilian hiring process), instituting a national training center for pilots as a pipeline for both civil and military aviation, and instituting a dual-track career path for pilots. Additional steps of adjusting pilot incentive pay and increasing UPT production are also discussed (Ballard, 1998). The focus of the study was retention and how to remedy low retention rates.

In a 2000 RAND study, Taylor, et al, attribute low retention rates to two primary reasons. The first was operations tempo, including deployments, frequent moves and quality-of-life issues. The second was the hiring boom of the late 1990s among the major airlines (Taylor et al, 2000). The authors assert that the real impact of the pilot shortage would be felt in the fighter community especially in trying to balance the mix of experienced and inexperienced pilots in flying squadrons (Taylor et al, 2000). As discussed previously, a drop in the numbers of experienced pilots in a squadron can have a ripple effect through the pilot force; namely to experience pilots at the desired rate, the Air Force will either have to over-man squadrons with experienced pilots further exacerbating pilot shortages, or increase the length of time in months it takes to experience a pilot, compromising the combat readiness of flying squadrons (Taylor et al, 2000). While the Taylor study identifies the experience issue as the true dilemma for the Air Force, it highlights pilot retention as one of the leading factors of the pilot shortage.

Unmanned Aircraft Systems

In an effort to address the pilot manning shortage, LaMarche (1999) proposes using unmanned aircraft. He suggests that Unmanned Aerial Vehicles (UAVs) for multiple missions

including reconnaissance, surveillance, target acquisition, or weapons employments would provide a solution to the pilot shortage (LaMarche, 1999). While the demand for UAVs (now UAS) technology has exploded in the last decade, as yet it has not proved to aid pilot manning numbers. In fact, current AF policy requires a pilot to fly UAS and current emerging UAS requirements is one of the greatest demand areas for rated manning (HQ USAF A3O-AT, Feb 2009).

Requirements

Over the course of the last decade, there has been a shift in literature concerning pilot manning. Whereas retention and supply-side discussion dominated the 1990s, the current focus on requirements offers a broader discussion. Emphasis on pilot production, absorption, and experience has not disappeared; rather it has been incorporated into a wider discussion of personnel management and allocation of scarce resources. As the research into supply-side issues in the 1980s and 1990s was driven by a solid economy and low retention rates, the increase in demand focused discussion today is similarly driven by the explosion of requirements, operational and otherwise, seen in the last two years.

An example of competing for resources is illustrated by an examination of AFSOC experience levels. The issue of experience adds to the complication of determining requirements for pilots. The criteria for experience are defined in AFI 11-412. Experience from an AFPC (personnel) view point is the number of hours an aircrew member needs to be considered experienced. Once a pilot has become “experienced” he/she can fill a job that requires an experienced pilot (e.g., staff, FTU IP). AFPC also uses the designation of “Experienced” to ensure units are manned at the appropriate experienced/inexperienced mix. The experience mix is also mandated by MWS in AFI 11-412. From a MAJCOM (operational) perspective,

experience level is tracked to determine when a crew member is ready to upgrade to the next leadership position (i.e. flight lead, instructor, etc). Through AFPC and MAJCOMs the AF uses the "Experience" and "Experience Mix" metrics to manage aircrew manning levels and unit operational readiness.

Pannell (2006) discusses the effects of declining experience levels on AFSOC. As in other weapon systems, he asserts that a squadron manned with too many inexperienced pilots will find inexperienced crew members stagnating in training, an increased competition for hours, and increased time to upgrade, which will all be compounded as experienced crewmembers move out of the airframe to other jobs (Pannell, 2006). Additionally, over-manning a squadron to compensate for inexperienced squadrons does not improve the health of the squadron; over-manning actually leads to the same outcome as an experience mismatch, declining experience levels which compromise combat readiness (Pannell, 2006). The author makes a case for changing the way the Air Force determines experience levels as one remedy to fix experience levels in AFSOC and also gives other solutions like redefining experience criteria to include more than simply hours flown (Pannell, 2006). The underlying theme of his research, however, is a tacit recognition that overall strain on pilot resources has directly contributed to the health of AFSOC flying forces.

In another study of resources, Wylie (2007) attempts to develop a Rated Officer Match Optimizer for staff positions in order to assess the quality of personnel assignments. One of the difficulties of developing such a tool is the prioritization of available staff assignments by different MAJCOMs. He asserts that not all commands provide a prioritized list to AFPC, so while the Operations Staff Assignments Branch determines how many entitlements a MAJCOM gets, there can be a great deal of subjectivity as to which assignments actually get filled (Wylie,

2007). To some extent, this begs the question of which positions really need a rated officer. Again, the underlying theme of this research is using a limited resource (pilots) to best fill ever-present requirements.

In a broader study of requirements, Turner (2006) looks to prioritization plans for ten different career fields to examine how the Air Force uses its personnel. With a changing force size and structure, he advocates a hard look at authorizations in different career fields, particularly those authorizations categorized as "taxes" (officers in students status, transition, formal school, or non-flying positions), to determine which positions are really required (Turner, 2006). One challenge he identifies for the rated force is the increased requirement for fighter pilot presence at Air Operations Centers (AOCs) for the War Fighting Headquarters (known in the Air Force as Component Numbered Air Forces, C-NAFs) at the same time the fighter force faces shortages of pilots to fill force requirements. This situation highlights a major organizational change that stresses the current personnel system (Turner, 2006). An additional point that captures a more delicate facet of the competition for resources is the desire to pare down requirements and yet maintain a cross-functional view of force development (Turner, 2006). To fill the needs of the twenty-first century Air Force, the Air Force must be more deliberate in managing scarce resources; in this case, its personnel.

The way ahead for the Air Force truly lies with a hard look at requirements—to adjust rated staff requirements to realistic levels. From a requirements perspective, the Air Force needs to validate rated requirement and, in the case of a valid requirements that does not require rated presence, seek alternative manning sources (HAF A3O-AT, 29 Oct 2008). Therein lays the objective of this research; to uncover if pilots develop unique knowledge, skills, and abilities

(KSAs) during flying assignments and to determine broadly which types of staff positions require a pilot's skill set.

Methodology: The Delphi Method

The overall research question posed by this study is "Do USAF staff positions require pilots?" The investigate questions used in the research included: What knowledge, skills, and abilities do pilots develop while flying?, Are the developed KSAs unique to pilots?, Are there some issues addressed by staffs that benefit from pilots' KSAs more than others?, Are other Air Force Specialty Codes (AFSCs) interchangeable with pilots in staff positions?, Does the USAF have a clear understanding of where it requires pilots on staff? The purpose of asking these questions is to better understand the supply/demand imbalance of pilots in the Air Force. Currently, Red Line/Blue Line estimates generated by the Air Staff A3O-AT as required by AFI 11-412 show a projected 829 pilot shortage for FY11 and steady in out years (HQ USAF A3O-AT, Oct 08). The vehicle used to investigate requirements was a three round Delphi study.

The Delphi Method was used to generate consensus between recognized experts in rated management. The Delphi Method was first developed by the RAND Corporation in the early 1950s. As Dalkey and Helmer (1962) describe, its purpose is to generate reliable consensus from a group of experts. Further study has suggested that the Delphi Method is useful for formulating inputs to new policies (Linstone and Turoff, 2002). The nature of rated management and pilots in staff positions does not lend itself to traditional analytical research because of the subjective nature of requirements and pilot KSAs. While the shortage of pilots to fill all requirements is measurable, how to bridge the gap invites multiple opinions and varying solutions. As a result, this area of research benefits from subjective expert judgment which is successfully gathered using the Delphi Method (Linstone and Turoff, 2002). As interpreted by multiple studies (Boone,

2007; Huscroft, 2008) and displayed in Table 2, the Delphi method is applicable for research questions that deal with opinion or imperfect knowledge.

Characteristic	**Description**
Anonymity	Respondents interact only with administrator; remain anonymous to one another
Controlled Feedback	Information gathered/redistributed via the administrator
Group Response	Individual responses collected to form group response
Expert Opinion	Respondents selected based on knowledge of the topic
Reduced Cost/Time	No need for face-to-face interviews or phone calls

Table 2. Characteristics of the Delphi Method

To achieve consensus among the panel, the researcher employed a variation of the three phases of data collection presented by Huscroft (2008) which are: (1) study preparation, (2) the collection of relevant issues via Delphi rounds, and (3) the identification and ranking of reported issues.

Figure 2 displays the three phases and related steps of the research methodology used in this study, which are subsequently described.

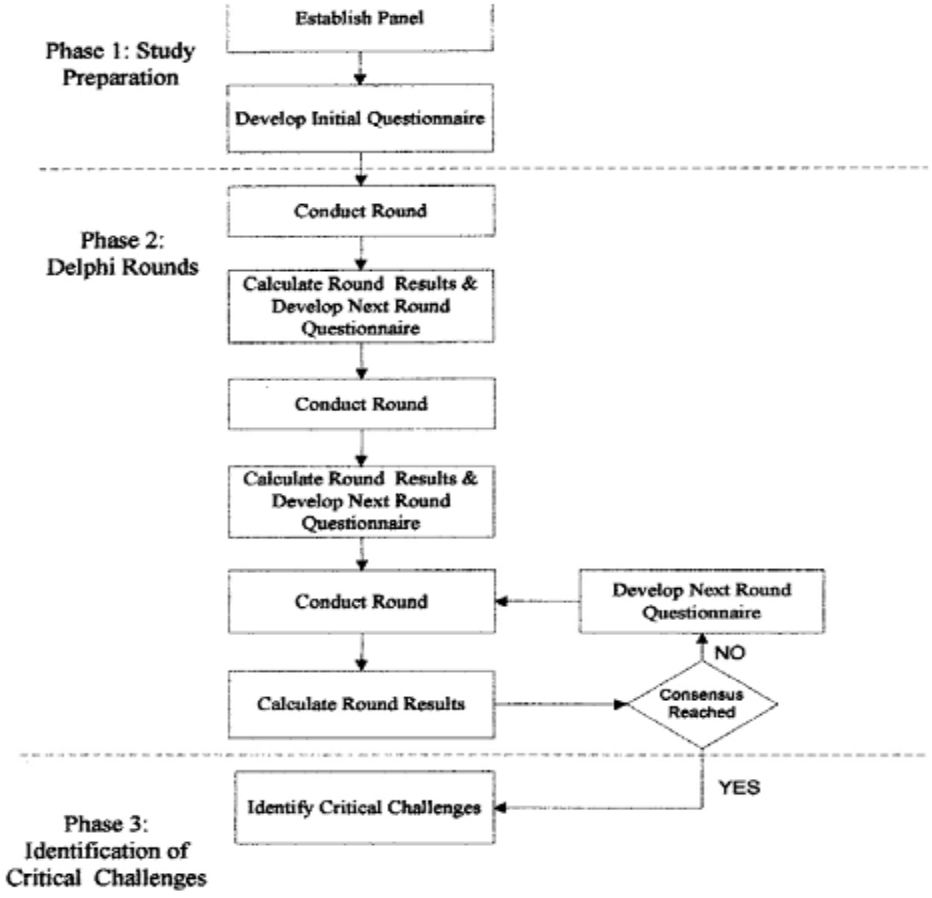

Figure 2. Research Methodology (Huscroft, 2008)

Phase one requires the selection of an expert panel and the development of the initial questionnaire. To ensure best results from the Delphi Method, a well-vetted group of experts should be surveyed. Using experts is sound because those selected should have information and experience to ensure the relevance and judgment of responses. This body of expert knowledge can bring objectivity to the answers generated (Helmer and Rescher, 1960). The experts in this study were selected by the researcher beginning with the MAJCOM Personnel Directorates of MAJCOMs with a large pilot population and then through suggestions from the sponsor.

Ultimately, the expert panel grew to include representatives from MAJCOM, Field Operating Agencies (FOAs) and Air Staff Manpower and Personnel (A1) and Operations (A3) directorates, including both civilian and military officers. The initial panel grew to 23 potential respondents, more thoroughly described in the analysis section. Recommendations for panel size vary, but a panel of at least ten respondents is documented to provide the best performance (Huscroft, 2008).

Once the expert panel is identified, the next step of phase one is to develop the initial questionnaire. In this research, an open ended questionnaire was used to solicit issues for future rounds of the survey as advocated by research standards (Schmidt, 1997; Huscroft, 2008). The goal of the first round is for respondents to illuminate issues relevant to the study. The initial questionnaire was distributed and collected via e-mail in order to reduce turnaround and response times (Lummus et al, 2005). Electronic media, such as e-mail, has been found to provide the same or slightly improved response rates and consistent validity in data compared to traditional paper survey methods (Griffis et al. 2003).

Phase two centered on multiple Delphi rounds and the collection of topic-relevant issues. Once Round One responses were collected, the researcher consolidated the responses into a single list. Instead of using the respondents to verify that terms have been properly mapped as Schmidt (1997) suggests, the Krippendorf (2004) preferred method of content analysis was used to illuminate the data. Content analysis was first used more than 200 years ago to analyze textual data from newspapers, magazines, and political speeches, among other things (Krippendorf, 2004). In ensuing centuries, it has been used in academic fields ranging from psychology to history to education (Mulla, 2008; Krippendorf, 2004). Content analysis is used to analyze textual data for the purpose of reducing responses into defined categories for better analysis and interpretation (Mulla, 2008).

In this study, three researchers formed a content analysis panel. The content analysis panel conducted independent data analysis of the five questions to determine the knowledge, skills, and abilities (KSAs) pilots develop in operational assignments, KSAs unique to pilots, and issues that benefit from pilot KSAs. Similar to content analysis performed by Sumer (2001), KSAs and issues that were explicitly stated by the respondents or inferred by the content analysis panel were included. If a KSA was repeated or described more than once by the same respondent, it was only counted once. KSAs and issues recorded by any two respondents were included in each list. Following Sumer's (2001) method, any disagreement between raters was resolved via discussion to resolve whether to include or remove the item in question.

Finally, phase two required the content analysis panel to pare down the list of items resulting from the analysis so the data could be meaningfully ranked and ordered during subsequent rounds of the survey. The issues identified in Round One were randomly listed for ranking in Round Two. In this study, spurious items from Round One were eliminated by the content analysis panel. In this case, the lists generated after content analysis were all shorter than ten items, so no statistical bounding was necessary to shorten the list (Schmidt, 1997).

In phase three, a ranked list is developed by the researcher. Respondents then review the ranked list and make any needed adjustments. The Delphi Method uses an iterative approach (i.e., multiple rounds in phase two), which allowed respondents to revise their choices and ultimately reveal a consensus on the ranked list. Kendall's Coefficient of Concordance (W) was used to provide a unique solution of consensus that is easy to interpret (Schmidt, 1997). Once consensus was achieved at an interpretation level of "strong agreement," the survey was considered complete.

Table 3 provides an interpretation of Kendall's *W*.

Interpretation of Kendall's *W*.		
W	Interpretation	Confidence in Ranks
.1	Very weak agreement	None
.3	Weak agreement	Low
.5	Moderate agreement	Fair
.7	Strong agreement	High
.9	Unusually strong agreement	Very High

Table 3. Kendall's *W* (Schmidt, 1997: 767)

The Research Instrument

This Delphi Study was conducted via e-mail using an electronic questionnaire. Three rounds were completed. Each round used a questionnaire developed specifically for that round of research based on the results of the previous round. The Round One questionnaire, designed to collect background information, elicit KSAs, and key staff issues is included as Appendix A. The Round Two questionnaire, which yielded initial rankings for responses to three Delphi questions, is included as Appendix B. The Round Three questionnaire, which established consensus among the expert panel, is included as Appendix C.

Analysis: The Expert Panel

The first round of the Delphi Study was delivered to 23 potential respondents. The list of 23 was identified first by identifying MAJCOM aircrew managers and MAJCOM personnel directorates. This initial list of potential respondents was reviewed by the Headquarters Air Force (HAF) A1PPR and other suggested respondents including individuals from the HAF Operations (A3) and AFPC DP were added. The initial list of respondents included 14 members of MAJCOM, FOA or Air Staff Personnel Directorates, eight members from different Operations Directorates, and one RAND analyst. The Delphi panel included representation from eight different commands (ACC, AMC, AFSOC, AETC, AFPC, PACAF, USAFE, HAF) and RAND. Respondents at the colonel level (O-6, GS-15 and YC-03) were targeted. The Round One panel

included 11 civilians and 12 officers. Once the list was generated, all potential respondents were contacted. All agreed to participate in the survey process.

Of the 23 initial respondents, 13 completed the Round One questionnaire. The makeup of the 13 respondents included seven civilians and six officers. Underscoring the expertise of this pool of experts was a combined 94.5 years of working rated management issues. Of the six officers included, all were in the rank of colonel. Two identified their primary functional background as pilot or navigator, three identified as personnelists, and one listed both navigator and personnel as primary functional background. There was also distribution of civilian expertise with five panel members serving in Operations Directorates and two serving in Personnel Directorates. More detailed experience levels are depicted in Table 4 below.

Respondent Yrs in Current Position	Less than 5 yrs 5 yrs or More	62% 38%
Respondent Yrs on MAJCOM-level or above Staff	Less than 5 yrs 5 yrs or More	0% 100%
Respondent Experience w/Rated Management	Less than 5 yrs 5 yrs or More	46% 54%

Table 4. Respondent Demographic Detail

In addition to the demographic information discussed above, the researcher asked the expert panel to assess the statement "pilot authorizations on MAJCOM-level or above staffs are in the appropriate directorates," on a Likert-type scale of 1 (strongly disagree) to 5 (strongly agree). The question was included to measure the overall climate of the panel. The responses ranged from 1 to 5 with a mean of 3.46, a mode and median of 4, and a standard deviation of .967. The average responses and standard deviated seems to indicate respondents typically

supported this sentiment; however, the discussion surrounding the question demonstrated it really is not a cut-and-dried issue. Further details will be presented in the discussion section.

Round One

Round One of the Delphi Study was a ten question questionnaire (Appendix A). The first five questions were designed to collect background on the respondents and establish the expertise of the panel. Question five (described above) was asked to determine the general mindset of the panel. The next five questions were used to uncover potential general knowledge, skills, abilities that can be considered unique to pilots. The intent of the survey was to determine whether pilots do indeed have unique experiences or develop unique KSAs; and if so, to determine which of those are needed on a MAJCOM or above level staff.

The first Delphi question (number six) asked respondents to list pilot KSAs beneficial to staff positions. As described in the methodology, content analysis was used to categorize the responses. The content analysis panel distilled the responses into eight general: MWS experience, tactical knowledge, leadership, operational experience, operational planning, resource management, strategic planning, and aircrew management. Question seven asked respondents to determine which of the skills listed in question six they considered unique to pilots. Again, the answers were refined into six distinct categories: MWS experience, tactical knowledge, familiarity with aircrew issues, knowledge of operational requirements, operational planning, and none. Question eight required respondents to list staff issues, as distinct from pilot skills, that befitted from pilot KSAs. The respondents answers were aggregated into nine distinct choices: aircrew management, tactical planning, operational planning, strategic planning, budget, acquisition, training, stan/eval, and safety.

After further review of the survey responses, the researcher determined to provide controlled feedback on questions six, seven, and eight. Questions nine devolved into a list of directorates with varying detail with no distinct pattern for categorization; it was decided that it was somewhat redundant to ask respondents to rank order the staff directorates especially as organizations tend to vary from staff to staff. Similarly, question ten provided good insight, thoughts, and discussion on the issue at large, but did not lend itself to a rank order follow-up. For these reasons, round two was scoped to readdress only questions six through eight.

Round Two

Round Two was the first round that required respondents to rank order the list generated from the answer pool. Thirteen respondents were surveyed; all thirteen questionnaires were returned but four were excluded from the analysis due to either late or incomplete answers. A description of how quickly rankings emerged is provided below (numbers following in parenthesis indicate the number of respondents who selected that ranking). In preliminary analysis, including completed answers from incomplete surveys, variation in answers existed, although patterns emerged in the initial ranking.

The answers to question six began to separate very quickly. There were only four different selections for the number one answer: MWS expertise (1), leadership (1), operational experience (9), and operational planning (1). For all rankings, the number of distinct items selected varied from four to six. Like number one, ranks seven and eight stood out early with strategic planning and resource management clearly trailing with low number rankings. Question six concluded Round Two with a Kendall's W=.624, and a preliminary ranking of: operational experience, operational planning, MWS expertise, tactical knowledge, leadership, aircrew management, resource management, and strategic planning.

Question seven proved to be the most problematic of the round, in part because it yielded three incomplete answers. The nature of the question, however, revealed a two opposing sides of the question. The issue was the inclusion of the answer "none" which appeared on more than one Round One responses. The answer "none" was polarizing. To address the question and try and determine an order of KSAs, "none" was eliminated from the respondent options in Round Three. Respondents who did not fully rank the list were no included in Round Three, eliminating two who ranked "none" first, and the respondent who ranked it second. Incomplete answers were also eliminated when compiling the preliminary ranking to redistribute. Round Two finished with a Kendall's *W*=.422 in the order as follows: MWS expertise, tactical knowledge, familiarity with aircrew issues, knowledge of operational requirements, operational planning.

Question eight evolved with similar patterns. For example, there were five different items selected as number one rank: aircrew management (1), operational planning (2), training (1), stan/eval (7), safety (1). Across the nine rankings, the number of items selected for each rank varied from a low of five to a high of seven. Similar to a clear number one emerging, the initial rank orders seemed to indicate a clear number nine—budget, selected by eight respondents. Round Two for question eight produced a Kendall's *W*=.543, with an initial ranking: stan/eval, training, operational planning, safety, tactical planning, aircrew management, strategic planning, acquisition, and budget.

Round Three

Round Three was distributed to the nine respondents who fully completed Round Two on time. In Round Three, respondents reviewed the rankings produced by Round Two and adjusted items as needed. Round Three generated a high level of agreement for all questions. No further

rounds were needed. Table 5 below lists the ordered answer to questions six, seven, and eight (per Round One designation) as well as the Round Three *W* for each question.

Rank	Question 6	Question 7	Question 8
1	Operational Experience	MWS Expertise	Stan/Eval
2	Operational Planning	Tactical Knowledge	Training
3	MWS Expertise	Familiarity with Aircrew Issues	Operational Planning
4	Tactical Knowledge	Knowledge of Operational Rqmts	Safety
5	Leadership	Operational Planning	Tactical Planning
6	Aircrew Management		Aircrew Management
7	Resource Management		Strategic Planning
8	Strategic Planning		Acquisition
9			Budget
	***W* = .973**	***W* = .98**	***W* = .967**

Table 5. Kendall's *W* for Questions 6, 7, 8 (Final)

Illumination of Problem

The Air Force is short of pilots to fill staff positions. Burgeoning line requirements, the evolution of the C-NAF and AOC construct, and a recent round of voluntary separations have left the Air Force unable to fill rated requirements—specifically pilots—on staff. Although the Air Force has aircrew management guidance, it is not a flawless process. In spite of efforts to balance staff and operational requirements, current manning levels have necessitated a drop in pilot presence on staffs. The current Rated Staff Allocation Plan (RSAP) illustrates this point. The FY09 RSAP calculates 3,005 pilot requirements and distributes a total of 814 entitlements (HQ USAF A3O-AT, Dec 2008a).

Table 6 provides a glimpse into projected manning levels per the FY09 RSAP at selected MAJCOMs and all ten Combatant Commands (COCOMs), as well as the Air Staff, the Office of the Secretary of Defense, Joint Staff, and NATO.

Organization	Pilot Requirement	Pilot Entitlement	Overall Pilot %
Overall Total	3005	814	27
SAF/HAF Staff	223	65	29
ACC Staff	318	92	29
AETC Staff	84	24	29
AFMC Staff	77	15	19
AFSOC Staff	63	18	29
AMC Staff	403	116	29
PACAF Staff	139	40	29
USAFE Staff	155	45	29
AFPC Staff	25	5	20
OSD Staff	7	3	43
Joint Staff	32	12	38
AFRICOM Staff	10	2	20
CENTCOM Staff	34	13	38
EUCOM Staff	37	7	19
JFCOM Staff	32	6	19
NATO Staff	50	10	20
NORTHCOM Staff	10	2	20
PACOM Staff	43	8	19
SOCOM Staff	42	16	38
SOUTHCOM Staff	8	2	25
STRATCOM Staff	31	6	19
TRANSCOM Staff	21	4	19

Table 6. Projected Pilot Manning Levels per FY09 RSAP

As previously discussed in the history and literature review sections, the Air Force has faced cyclical pilot shortages. Most efforts to cope with those shortages have been addressed to the supply side of the equation, although recently there has been a shift in focus onto demand, i.e. requirements. In an attempt to approach this situation from a different angle, this research investigated the knowledge, skills, and abilities pilots gain during operational assignments to determine if there is a natural fit into staff organizations to leverage that experience. This is not the same as evaluating the job requirements for every pilot authorization; rather, it was an attempt to broadly describe pilot KSAs and where those KSAs are most effective in a staff arena.

As opposed to traditional supply-side approaches, this demand-side perspective is relevant considering the "do-less-with-more" environment and fiscal constraints of today's Air Force and potentially offers insight to a long-term fix.

Air Force Guidance

Several Air Force instructions lay out the process for aircrew management. These include AFI 11-412, *Aircrew Management*, AFI 36-2101, *Classifying Military Personnel*, and AFI 38-201, *Determining Manpower Requirements.* These instructions provide the framework for managing Air Force pilots. Aircrew management is overseen by aircrew managers and rated force policy officers to manage lieutenant colonel-and-below aircrew requirements and shape inventories to meet the requirements (AFI 11-412, 2005). At the MAJCOM level, responsibilities include readiness, absorption, manpower requirements, and inventory management (AFI 11-412, 2005). Per AFI 11-412, the major tenets of aircrew management are illustrated in Table 7.

AIRCREW MANAGEMENT TENETS

- **Optimize Absorption to sustain requirements within readiness parameters (Manning Level, Experience Mix, Average Time on Station)**
- **Size Accessions/Training (Production) based on operational needs**
- **Improve Retention through credible, congruent, long-term-focused policies and actions that facilitate force sustainability**
- **Set Manpower Requirements to provide sufficient line force positions to meet operational taskings and efficiently support (Training/Staff/Test/Other) operations**
- **Manage the Aerospace Force (Aircrews and Aircraft)**
  - **Actions that reflect AF priorities to include preservation of institutional culture**
  - **Smooth, incremental adjustments to get/keep the system in balance -- operate within reasonable bands**
  - **Fully coordinated actions that make sense for the short and long term**
  - **Effective use of all available aircrew expertise/assets as required**
  - **Litmus Test: Will the decision/action improve mission capability?**

Table 7. Aircrew Management Tenets (sourced from AFI 11-412, 2005)

Air Force instructions also describe the mechanisms to implement management techniques. Specifically, MAJCOMs are required to conduct an annual review of staff positions, "to ensure aviator expertise is required" (AFI 38-201, 2003: 43; AFI 11-412, 2005). Similarly, FOAs, Direct Reporting Units (DRUs), and Joint agencies are tasked to "Assign rated AFSCs only to those positions with duties clearly requiring rated skills as described in AFM 36-2105 (sic)" (AFI 38-201, 2003: 43). Additionally, Redline/Blueline charts are prepared semi-annually and are used to requirements and inventory data to Air Force Senior Leaders and MAJCOMs. An example was provided earlier in the form of Figure 1.

Air Force instructions list four preferred methods for reducing or eliminating aircrew shortfalls: Improve Retention, Reduce Support Requirements, Increase Absorption Capability, and Use Alternate Staff Manning (AFI 11-412, 2005). The method of reducing support requirements includes deleting obsolete requirements, organizational structure changes, and using Total Force Initiatives or civilian conversion to minimize the strain on active duty personnel (AFI 11-412, 2005). The Air Force Form 480 is the mechanism to provide rationale to request new authorizations and changes to existing authorizations not established by an Air Force Manpower Standard (AFI 11-412, 2005; AFI 38-201, 2003).

The growth of rated staff requirements is also limited by law. The Air Force considers Public Law 101-189 SEC. 633 as the source for the "No Rated Staff Growth Policy." This policy requires the AF to limit/control the growth of rated requirements except for those sustainable by the absorbable force structure. The purpose of guidance in AFI 11-412 and AFI 38-201 is to recognize the fundamental need for balancing the requirements of overhead positions, i.e., staff officers, with line pilots to ensure a sustainable force. Ideally, new staff authorizations must be

offset unless they are a product of either new or existing weapons systems growth (AFI 38-201, 2003).

Delphi Panel Perspective

The purpose of this research was to investigate whether or not USAF staff positions require pilots. Furthermore, it was designed to investigate if pilots develop unique KSAs in flying assignments and if there were clear requirements for pilots in certain positions over others. As discussed in the methodology and analysis sections, the means to address these questions was a three round Delphi questionnaire comprised of background questions and five potential multi-round questions.

The first discussion point is the response to the background question five (Appendix A) which directed respondents to assess the statement, "pilot authorizations on MAJCOM-level or above staffs are in the appropriate directorates." As discussed previously, responses on the Likert-type scale varied from 1 (strongly disagree) to 5 (strongly agree), with a mean of 3.46 and a standard deviation of .967. What this suggests is a fundamental agreement with where pilot authorizations on staff currently reside—namely in operationally related staff functions.

Internal Air Force metrics for tracking manpower authorizations provide insight into where all rated billets reside. A snapshot taken in January 2009 shows that a preponderance of rated (not just pilot) assets reside inside the 3s (operations) of above-wing-level staffs. For example, 123 of 631 (19.4%) of all COCOM billets are in the J3 (HQ USAF A3O-AT, Jan 2009). Similarly, inside MAJCOM HQ billets, 472 of 851 (55.5%) billets are allocated to A3s (Winslow). At the NAFs, 485 of 793 (61.2%) of assets are allocated to the AOCs (Winslow), which, while not truly a 3, perform functions such as tactical planning and execution that are generally operational roles.

What is revealed is that the system as designed might work, but external factors such as micro-management, bloated requirements, and decreasing numbers of cockpits which impacts absorption, the production of experienced pilots, etc., has strained the system. Six respondents identified assignments such as commander's action group, executive officers, and aide-de-camps as examples of positions where pilots are desired but not required (Expert Panel, Mar 2009). Additionally, respondents expressed concern that there is an overabundance of rated staff requirements without knowing what the requirement is (Expert Panel, Mar 2009). One study respondent suggested the Air Force needs to do a better job of challenging why other AFSCs cannot fill the authorization and not fall back on the sense that Senior Leaders would rather have a pilot. A shrinking Air Force has lost its ability to source and maintain such a large presence of pilots on staffs. One of the respondents who agreed with the statement at a level 4 (agree) summed it up best: "The positions identified for pilot are generally in the right place and are properly identified in terms of the kind of expertise needed to perform the function. It may well be that our view of what constitutes a valid pilot (or rated in general) requirement is burdened with some historical baggage."

While the numerical response seems positive, the elaboration offered in addition to the Likert scale response offers some insight as to what is contributing to the pilot shortfall. As demonstrated, the dialogue accompanying the moderate responses leaned toward the critical, albeit the criticism tends to cite complacency the more likely culprit than a broken process. From the dialogue emerged three general themes in the responses.

The first thematic response identified a failure on the Air Force's part to recognize more general trends in manning and budgetary constraints; specifically the continued willingness to use rated officers in positions where rated requirements were not formally established.

Comments ranged from general observations such as, “While our staff manning was reasonably high, this was not a significant issue…” to the more specific recommendations to “launch an AF-wide rated staff manpower study…[to] fully understand the scope and specifics related to what needs to be classified as a rated staff position and what does not” (Expert Panel, Mar 2009). The most damning language viewed pilot requirements as “bloated” and offered that the Air Force had “outgrown (its) ability to source/sustain such a large rated staff…[The Air Force needs to look] to reduce already large staffs that were established under a Cold War Air Force that no longer have (sic) the iron or production capacity to keep these staffs manned at the same levels” (Expert Panel, Mar 2009). Fundamentally, the question is, where the Air Force has drawn down support staff requirements, why not rated staff as well?

The second thematic response is an acknowledgment of the need for pilot experience, but uncertainty that an active duty pilot is the only appropriate fill for the requirement. Definitely linked to the first theme of an unsustainable staff requirement, these responses advocate alternate sources of pilot experience. One respondent indicated the Air Force needed to look more frequently for opportunities to “borrow” rated expertise when it was needed as opposed to having a full-time pilot on staff. In addition to the use of other AFSCs, three respondents specifically mentioned the use of civilians with previous Air Force/military pilot experience. Conversion to civilian positions is not a new idea, though one respondent thoughtfully examined different staff positions’ need for recency of experience and how that might shape civilian conversion decisions. He suggested a current, i.e. active duty, pilot might be essential for stan/eval and tactics functions, but offered that there other policy-oriented positions that would benefit equally from a retired pilot who has acquired more “timeless” pilot skills (Expert Panel, Mar 2009).

The third overriding theme adds an element of complexity to the issue. This theme was recurring through accompanying comments to all three rounds of the survey—the issue of force development. The justification for using pilots in non-rated positions like executive officer and aide-de-camp is the mentoring and leadership development for officers in those positions. Positions above the MAJCOM level are viewed especially as opportunities for development and broadening. One respondent observed that staff positions are one area to develop future leaders; if a broader set of competencies are required of leaders, then denying pilots staff positions may limit future leadership opportunities. And, stepping back from the perspective of the pilot, one respondent suggests a shift in the view from the oft asked question, "What does the staff bring to the pilot that the pilot needs to have?" to the more enterprise-focused perspective, "[W]hat they take from the job back to the operational environment is crucial to both the growth of the officers and the growth of the institution" (Expert Panel, Mar 2009). As demonstrated, the panel indicated general satisfaction with the processes established by the Air Force for determining rated staff requirements, but suggests a tightening of application and/or a less liberal interpretation of where pilot requirements actually exist.

Delphi Questions Discussion

The survey was set up to ask five separate questions of the expert panel (Appendix A). The five Delphi questions are listed in Table 8 below.

Question #	
6	Please list and describe knowledge, skills, and abilities pilots develop during operational assignments that are beneficial to staff positions.
7	Which of these knowledge, skills, and abilities do you consider unique to pilots?
8	Please list and describe ***issues*** addressed at MAJCOM-level or above staffs you feel benefit from having a pilot address the issue.
9	In your opinion, are there specific MAJCOM-level or above staff ***positions*** that require the skill sets or experiences of a pilot?
10	Are there staff positions currently allocated for pilots that an officer with a different AFSC (rated or non-rated) could fill? Please specify which staff positions you believe to be interchangeable (i.e. duty title, directorate, etc.).

Table 8. Delphi Questions

The questions were asked in an order to first identify KSAs pilots develop during operational assignments and then to determine which of those KSAs are useful in a staff position. The purpose of asking the question this way was to try and move past a simple description of "stick-and-rudder" skills—hard skills—to identify soft skills developed during operational tours. Question seven was designed to build on six and force respondents to consider which, if any, of the KSAs listed were unique to pilots. Again, the focus of this study is on the pilot and what a pilot has the potential to bring to a position, rather than the developmental issues of staff work.

Respondents' answers to question six did vary; from responses that captured the physical nature of flying, to operational experiences, and then general traits of leadership and followership. As respondents listed KSAs, they articulated many of the assumptions about pilot skills and experiences widely believed to be true in the Air Force. In most instances, the simple list was accompanied by additional thoughts on ownership of those KSAs. As in the non-Delphi

question five, three thematic questions emerged:

1. Can the Air Force sustain its current organizational (staff) structure?
2. Are active duty pilots the only officers with said KSAs?
3. What about force development?

These side-bar comments made for lively, and pointed, commentary in the following questions, particularly question seven.

Question seven (see Table 8 above) proved to be a polarizing question, especially when it came to Round Two of the survey. In Round One, there was one respondent who stated "none" and two others who answered "none, but…" The rest of the respondents listed all or part of their response to question six as their answer to question seven. During content analysis, the respondent's answers were distilled to six KSAs, one of which was "none." "None" was included in Round Two of the survey. Before eliminating incomplete answers, four of 13 respondents selected "none" as the number one-ranked unique KSA for pilots. A fifth respondent selected "none" in the 2 position. Furthermore, three of those respondents failed to rank the other KSAs (and as a result were eliminated from Round Three of the survey).

At the other end of the ranking spectrum, eight respondents ranked "none" as six—last in order of importance. This distinct split demonstrates there is a significant voice inside the rated management community that questions whether or not pilots really have unique skills requisite on a staff. A closer look at the five respondents who selected "none" as their first or second rank reveals that this opinion is resident across the spectrum of respondents, not isolated in one type of respondent. Of the five, two were colonels and three were civilians. The respondents came from both the personnel (three respondents) and operations realm (two respondents).

As a result of the divisive nature of the answer "none", it was not offered as a selection in Round Three of the survey. However, this does not mean that "none" is an invalid or unhelpful answer; rather, it demonstrates a willingness to entertain other solutions to bringing typically construed pilot KSAs onto the staff. As with other questions, there was additional discussion surrounding a straight numerical ranking. One respondent took exception to the question because it failed to distinguish between single-seat fighters and crew airplanes; the point there that crew aircraft have other crew members who cultivate the same KSAs as pilots of those MWSs. A second respondent determined that pilots might develop the listed KSAs with more depth, but that "these things are not unique to pilots alone" (Expert Panel Round 2, Apr 2009). Both responses illuminate the point that it is difficult to make a distinction between "pilot related" and more broadly, "rated." This issue ties back to comments concerning the uniqueness of KSAs to pilots which appear in Round One responses to questions six and seven, discussed previously.

The rank-ordered response to question eight (see Table 5) highlights the operational nature of the KSAs identified in questions six and seven. The operational emphasis of the KSAs translates to issues that benefit from MWS knowledge and tactical experience. Issues such as Stan/Eval, Training, Safety, Operational and Tactical Planning are functions that most often reside inside an Operations Directorate, as do portions of Aircrew Management. The identification of these issues reinforces the general perceived satisfaction of the current placement of pilots on staff. The inclusion of issues not considered strictly operational such as Strategic Planning, Aircrew Management, and Acquisition, however, indicates an opening for disagreement/discussion on other arenas that benefit from pilot KSAs and contribute to the discussion on force development and broadening. The rank-ordered response to question eight is

consistent with the nature of the responses and comments pertaining to questions five through seven.

Question nine was eliminated after Round One. It proved difficult to use past the first round because respondents tended to provide a laundry list of directorates and duty titles which benefitted from pilots. Because the organization of staffs varies slightly, the researcher determined asking respondents to rank order such a list would prove more distracting than useful. Additionally, the desire to link pilot KSAs with specific requirements was illustrated in more universal terms through question eight; essentially questions eight and nine collapsed because of redundancy.

Like question nine, question ten was used only in Round One. In some respects, the question devolved into a simple yes/no paradigm, which is not particularly suited for the Delphi Method. Also, like question nine, some responses tended towards staff specific laundry lists; again, hard to categorize for general discussion. Question ten did add to the discussion as a mechanism for respondents to offer recommendations and thoughts on addressing pilot shortages on staff. Several distinct suggestions and comments arose from the responses.

One set of respondents observed that pilot experience was needed in some form or another on staffs—retired pilot, active duty, or ARC/ANG. The implication is that a current, active-duty pilot might not be the only appropriate, or even viable, solution for filling requirements given the current climate. Tied to this observation is the suggestion to examine positions requiring pilot KSAs and source the requirement different depending on needed currency levels (e.g., flight examiner vs. planner). Alternatively, while pilot KSAs are needed, it is possible to find those KSAs resident in other rated crew members—thus the difficulty in breaking apart purely “pilot” from “rated” experience.

An astute comment on the survey as a whole suggested that the question of whether or not pilots can be replaced by other AFSCs has been answered by default in that the Air Force will take this route because it has to—a result of the rated shortfall. Others agreed that the pilot shortfall is reality and that the Air Force needs to conduct and Air Force-wide rated staff manpower study; to challenge every AFSC on every Rated Management Position to determine actual requirements. Even the most pragmatic, however, caution that scaling back pilot requirements to fill only functional positions will cost the Air Force in the long run. Limiting pilots to operationally-focused staff positions only will limit opportunities for growth outside of core competencies and hamstring force development initiatives.

Limitations and Future Research

As with all qualitative research, there are limitations to this study. First, fundamentally, the Delphi Method is a survey based on inputs and opinions of an expert panel. Due to the subjective nature of the questions, it is likely a different panel might yield different answers. Second, this research focused solely on pilots. It is difficult to divorce pilots from other rated requirements and in fact, some might suggest it is an artificial distinction. Third, as previously discussed, the answer of "None" to question seven proved to be divisive. While inclusion of the answer did not impact Round Two results significantly, the exclusion of "None" from Round Three does affect the final results and further highlights the potential artificial distinction between pilots and other rated officers. Finally, while overall panel participation was good, the response rate to Round One (13 of 23, 56.5%) was much lower than expected considering respondents were vetted for willingness to participate before the first questionnaire was circulated. Timing is likely a factor that drove low Round One response rates as the spring

months are a busy period in the Air Force assignment cycle. These limitations do not diminish the validity of the research results but could reduce the generalizability to other fields.

This research addressed one aspect of pilot manning—pilots on staff—through an examination of unique pilot KSAs and staff issues that benefit from those pilot KSAs. The issue of pilot manning is part of the overall end-strength and composition of the Air Force although pilot manning receives specific attention because of the culture and mission of the Air Force. There are other approaches to the broader problem. Suggestions for further research include, but are not limited to: examining the role and interplay of organizational structures, e.g. C-NAFs and MAJCOMs and the impact on rated manning; evaluation of the use of military to civilian conversion; discussion/definition of an Air Force operator; defining desired competencies for future leaders and determining how those competencies are best developed; undertaking a complete manpower review of current pilot authorizations; a review of the impact of "By Name Requests" (BNRs) on assignment process; examining the impact of less than 100% manning in force and training billets.

Conclusions/Recommendations

"Rated manning, if we don't do it right, will kill us in this headquarters."

—Brigadier General Douglas H. Owens, 13 AF/CV, 11 May 2009

This research yields four conclusions: 1. Pilot KSAs (in some form) are needed on staffs, 2. Pilot KSAs are most critical to operational issues usually resident in Operations Directorates (A3/J3), 3. The professional development of pilots necessitates pilots on staffs in areas outside of operations, but these positions are the most subjective and therefore the most difficult requirements to determine, 4. The Air Force cannot afford its current staff bill, and will likely need to perform an in-depth pilot (rated) requirements review to determine what it can afford

now, and ideally, in the future. The three-round Delphi survey was useful to illuminate heretofore assumptions about pilots on staff. The high level of consensus demonstrated a general agreement that unique pilot KSAs are operational skills and experiences.

The Air Force has chased the pilot manning issue, swinging the pendulum from left to right, varying production to meet desired numbers. This approach has not worked in the past, and will continue to fail until the Air Force can define what it really needs. Until requirements are determined, the Air Force will continue to chase manning numbers. While operational requirements are easier to define, even that piece is complicated, as demonstrated recently by unexpected emerging requirements, e.g. reconnaissance and UAS pilots. A separate but related complication to requirements is the need to grow future leaders through professional development opportunities; requirements even more difficult to determine because oftentimes those opportunities are tied to individual personalities and situations.

The Air Force must determine its requirements because lean days are likely to continue. Determining future requirements will be the most difficult part of any requirements review because it of the uncertainties of the future. Issues likely to complicate projections are the crew size of the future tanker: will it have the same crew requirements as current fleet? The price tag on future weapons systems: will future hardware be so expensive that the number of aircraft per MWS drops to the point that the ability to produce experienced pilots is fundamentally different? The organizational structure of the Air Force: will the C-NAF concept remain in place? If so, with what alterations? Finally, the Air Force must have the discussion about future leadership and force development. Who are the operators? Who are the future AF leaders? If operators are the future leaders, then the definition of operator is paramount. Equally important, who does the joint community expect at the table? As the Air Force evolves and continues to address what it

brings to the joint fight, it will likely see a corresponding evolution of who is perceived to be an operator.

In a broader sense, the Air Force approach to pilot manning is best described with the policy model of incrementalism. Incrementalism is characterized by heavy investments in existing programs, which preclude any really radical change (Dye, 2008). When applied to rated manning, the Air Force heavy investment is in administrative practices and organizational structure. Like Congress's approach to the budget, the Air Force does not appear to have the time, energy or information to review every dollar (manpower position) of every budget request (each different staff) (Dye, 2008). Pilot manning is likely to continue to suffer similar effects to every issue that is modified incrementally—while particular demands may be satisfied, major policy shifts required to maximize values will be overlooked (Dye, 2008).

This research is a first step at identifying a path out of the pilot conundrum—demand outstripping supply obscured by an ill-defined picture of actual requirements. Through a Delphi Study, the expert panel concluded issues that fall into the Operations Directorates of staffs benefit most from pilot experience. While this is not necessarily unexpected, it is useful to have expert consensus on a cultural "given." While fairly straightforward, the expert panel opinion is complicated by seemingly contradictory inputs. First, there is a general undertone that many current pilot staff positions could probably be filled by other AFSCs or converted to civilian positions. Additionally, the expert panel raised an issue that pulls away from the purely functional realm; like it or not, pilots on staff is as much about what is good for the Air Force as it is officer professional development. Stripping staffs of pilots hurts the Air Force, limits the range of experience pilots take back to the operational world, and stifles professional development.

Appendix A. Pilot Staff Manning Survey Questionnaire

Thank you for participating in this survey. I appreciate your time and candid responses. The sponsor for this research is Col Charles P. Armentrout, AF/A1PP. The purpose of this research is to explore areas on staffs that benefit from pilot knowledge, skills, and abilities. Please note the following:

1. Survey responses are confidential. Your identity (name or duty title) will not be associated with any responses you give in the final research report. Summarized responses will be releasable to the public under the Freedom of Information Act, but your identity and/or organizational information will not be associated with a questionnaire and will be known only by me. The survey is administered under AFIT Survey Control Number SC 09 009.

2. Please complete this survey **electronically** and return it to: margaret.martin@mcguire.af.mil. If you have questions on the survey or the survey process, I can be reached at DSN 650-7748. Written correspondence can be addressed to:

   Maj Margaret Martin
   ASAM Student
   5656 Texas Avenue; Room 403
   Fort Dix, NJ 08640

3. Please complete this survey and return it electronically no later than **23 Mar 2009**.

4. There are 10 questions. The survey is "non-attribution", so please elaborate fully on your answers. Once all survey responses are received, you will be asked to revise your initial responses to questions 5-10 based on responses provided by the entire group. Subsequent rounds will be announced as needed and all research will conclude by June 2009.

Background:

1. Personal Information:
   a. Name:
   b. Rank/Grade:
   c. Current Duty Title:
   d. Time in Current Duty Position:
   e. Core AFSC:

2. How many total years have you served on a MAJCOM-level or above staff (include FOAs, DRUs, etc)?

3. How many total years have you worked (been involved with) Rated Staff Management issues?

4. Considering all your staff roles, in what capacity have you dealt with Rated Staff Management issues?

5. On a scale from 1 to 5 (1-strongly disagree, 3-neither agree/disagree, 5-strongly agree) assess the statement, “pilot authorizations on MAJCOM-level or above staffs are in the appropriate directorates.” Please elaborate on your response.

Please answer and elaborate on the following questions:

6. Please list and describe knowledge, skills, and abilities pilots develop during operational assignments that are beneficial to staff positions.

7. Which of these knowledge, skills, and abilities do you consider unique to pilots?

8. Please list and describe ***issues*** addressed at MAJCOM-level or above staffs you feel benefit from having a pilot address the issue.

9. In your opinion, are there specific MAJCOM-level or above staff ***positions*** that require the skill sets or experiences of a pilot?

10. Are there staff positions currently allocated for pilots that an officer with a different AFSC (rated or non-rated) could fill? Please specify which staff positions you believe to be interchangeable (i.e. duty title, directorate, etc.).

Appendix B. Pilot Staff Manning Survey Questionnaire, Round 2

Thank you for participating in this survey. I appreciate your time and candid responses. The sponsor for this research is Col Charles P. Armentrout, AF/A1PP. The purpose of this research is to explore areas on staffs that benefit from pilot knowledge, skills, and abilities. Please note:

1. Survey responses are confidential. Your identity (name or duty title) will not be associated with any responses you give in the final research report. Summarized responses will be releasable to the public under the Freedom of Information Act, but your identity and/or organizational information will not be associated with a questionnaire and will be known only by me. The survey is administered under AFIT Survey Control Number SC 09 009.

2. Please complete this survey electronically and return it to: margaret.martin@mcguire.af.mil. If you have questions on the survey or the process, I can be reached at DSN 650-7748.

3. Please complete this survey and return it electronically no later than 18 April 2009.

4. This is round two of the survey. The purpose of this round is to rank the responses given by all respondents in order of importance. Please rank the responses in order as you determine from most important to least important. Subsequent rounds will be announced as needed and all research will conclude by June 2009.

Please rank order the responses given to the selected round one questions below:

1. Original Question: Please list and describe knowledge, skills, and abilities pilots develop during operational assignments that are beneficial to staff positions.

Respondents' answers:	Rank (1-8, 1 being most important):
MWS Expertise	_____
Tactical Knowledge	_____
Leadership	_____
Operational Experience	_____
Operational Planning	_____
Resource Management	_____
Strategic Planning	_____
Aircrew Management	_____

2. Original Question: Which of these knowledge, skills, and abilities do you consider unique to pilots?

Respondents' answers:	Rank (1-6, 1 being most important):
MWS Expertise	_____
Tactical Knowledge	_____
Familiarity with Aircrew Issues	_____
Knowledge of Operational Requirements	_____
Operational Planning	_____
None	_____

3. Original Question: Please list and describe issues addressed at MAJCOM-level or above staffs you feel benefit from having a pilot address the issue.

Respondents' answers:	Rank (1-9, 1 being most important):
Aircrew Management	_____
Tactical Planning	_____
Operational Planning	_____
Strategic Planning	_____
Budget	_____
Acquisition	_____
Training	_____
Stan/Eval	_____
Safety	_____

Appendix C. Pilot Staff Manning Survey Questionnaire, Round 3

Thank you for participating in this survey. I appreciate your time and candid responses. The sponsor for this research is Col Charles P. Armentrout, AF/A1PP. The purpose of this research is to explore areas on staffs that benefit from pilot knowledge, skills, and abilities. Please note:

1. Survey responses are confidential. Your identity (name or duty title) will not be associated with any responses you give in the final research report. Summarized responses will be releasable to the public under the Freedom of Information Act, but your identity and/or organizational information will not be associated with a questionnaire and will be known only by me. The survey is administered under AFIT Survey Control Number SC 09 009.

2. Please complete this survey electronically and return it to: margaret.martin@mcguire.af.mil. If you have questions on the survey or the process, I can be reached at DSN 650-7748.

3. Please complete this survey and return it electronically no later than 30 April 2009.

4. This is round three of the survey. The purpose of this round is to review the rank order developed by the group in an effort to reach consensus. Please review the group-determined rank and indicate your agreement, or re-rank the list as you determine necessary. The items are ranked in order from most important to least important. Subsequent rounds will be announced as needed and all research will conclude by June 2009.

Please review the group-determined rankings for each question. Indicate your agreement by selecting yes, or select no and re-rank as needed:

1. Original Question: Please list and describe knowledge, skills, and abilities pilots develop during operational assignments that are beneficial to staff positions.

   Group-Determined Rank: Your Rank (1-8, 1 being most important):

   I agree with rankings as listed. _____ Yes /_____ No

   Operational Experience (1) _____

   Operational Planning (2) _____

   MWS Expertise (3) _____

   Tactical Knowledge (4) _____

   Leadership (5) _____

   Aircrew Management (6) _____

   Resource Management (7) _____

Strategic Planning (8) _____

2. Original Question: Which of these knowledge, skills, and abilities do you consider unique to pilots?

Group-Determined Rank: Your Rank (1-6, 1 being most important):

I agree with rankings as listed. _____ Yes /_____ No

MWS Expertise (1) _____

Tactical Knowledge (2) _____

Familiarity with Aircrew Issues (3) _____

Knowledge of Operational Requirements (4) _____

Operational Planning (5) _____

3. Original Question: Please list and describe issues addressed at MAJCOM-level or above staffs you feel benefit from having a pilot address the issue.

Respondents' answers: Your Rank (1-9, 1 being most important):

I agree with rankings as listed. _____ Yes /_____ No

Stan/Eval (1) _____

Training (2) _____

Operational Planning (3) _____

Safety (4) _____

Tactical Planning (5) _____

Aircrew Management (6) _____

Strategic Planning (7) _____

Acquisition (8) _____

Budget (9) _____

Appendix D. Human Subject Exemption Approval

MEMORANDUM FOR DR. BEN SKIPPER

FROM: Dr. William Cunningham
AFIT IRB Research Reviewer
2950 Hobson Way
Wright-Patterson AFB, OH 45433-7765

SUBJECT: Approval for exemption request from human experimentation requirements (32 CFR 219, DoDD 3216.2 and AFI 40-402) for study titled "Air Force Pilots in Staff Positions: A Rated Management Issue"

1. Your request was based on the Code of Federal Regulations, title 32, part 219, section 101, paragraph (b) (2) Research activities that involve the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior unless: (i) Information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) Any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

2. Your study qualifies for this exemption because you are not collecting sensitive data, which could reasonably damage the subjects' financial standing, employability, or reputation. In addition, you are not collecting any identifying information. Therefore, it is impossible to determine from whom the responses came. Further, the demographic data you are collecting cannot realistically be expected to map a given response to a specific subject.

3. This determination pertains only to the Federal, Department of Defense, and Air Force regulations that govern the use of human subjects in research. Further, if a subject's future response reasonably places them at risk of criminal or civil liability or is damaging to their financial standing, employability, or reputation, you are required to file an adverse event report with this office immediately.

WILLIAM CUNNINGHAM, PHD, CTL
AFIT Research Reviewer

Bibliography

Air Force Personnel Center (AFPC). "Service Demographics Offer Snapshot of Force." 16 January 2009. Accessed online 27 February 2009. http://www.afpc.randolph.af.mil/news/story.asp?id=123131685 Accessed 27 February 2009.

Ballard, Lloyd A. *A Critical Look at the Pilot Retention Problem in the Air Force*. Graduate Research Project, AFIT/GMO/LAL/98J-2. School of Logistics and Acquisition Management, Air Force Institute of Technology (AU), Wright Patterson AFB, OH, June 1998.

Boone, Christopher A., Christopher W. Craighead and Joe B. Hanna. "Critical Challenges of Inventory Management in Service Parts Supply: A Delphi Study," *Operations Management Research*, 1 (31-39) (September 2008).

Brown, Bernice B. "Delphi Process: A Methodology Used for the Elicitation of Opinions of Experts," RAND Corporation, P-3925, September 1968.

Dalonzo, William J. *McPeak's Follies: A Comprehensive Look at Rated Management in the 90's and Beyond*. Graduate Research Project, AU/ACSC/037/1999-04. Air Command and Staff College, Air University, Maxwell AFB, AL, April 1999.

Dalkey, Norman C. "The Delphi Method: An Experimental Study of Group Opinion." Rand Corporation, RM-5888-PR, June 1969.

Dalkey, Norman and Olaf Helmer. "An Experimental Application of The Delphi Method to the Use of Experts." RAND Corporation Memorandum, RM-727/1-Abridged, July 1962.

Department of the Air Force, *Air Force Officer Classification Directory (AFOCD).* San Antonio, TX, HQ AFPC/DPSIDC, 31 Jan 2009 (corrected copy 26 Jan 2009). https://gum.afpc.randolph.af.mil/cgi-bin/askafpc.cfg/php/enduser/std_adp.php?p_faqid=7759&p_created=1168288253&p_sid=7z2f1cyj&p_accessibility=0&p_redirect=&p_lva=&p_sp=cF9zcmNoPTEmcF9zb3J0X2J5PSZwX2dyaWRzb3J0PSZwX3Jvd19jbnQ9Nyw3JnBfcHJvZHM9JnBfY2F0cz0mcF9wdj0mcF9jdj0mcF9wYWdlPTEmcF9zZWFyY2hfdGV4dD1haXIgZm9yY2Ugb2ZmaWNlciBjbGFzc2lmaWNhdGlvbiBkaXJlY3Rvcmllcw**&p_li=&p_topview=1&rstr_flag=1

-----. *Aircrew Management*. AFI 11-412. Washington, HQ USAF, 25 April 2005 (incorporates Change 1, 10 September 2008). http://www.e- publishing.af.mil/shared/media/epubs/AFI11-412.pdf

-----. *Classifying Military Personnel (Officer and Enlisted).* AFI 36-2101. Washington, HQ USAF, 7 March 2006. http://www.e-publishing.af.mil/shared/media/epubs/AFI36-2101.pdf

-----. *Determining Manpower Requirements.* AFI 38-201. Washington, HQ USAF, 30 December 2003. http://www.e-publishing.af.mil/shared/media/epubs/AFI38-201.pdf

Department of Sustainability and Environment, Australia, *Delphi Study*. On-line Toolkit, last updated July 11, 2007. Accessed online, 3 March 2009. http://www.dse.vic.gov.au/

Dye, Thomas R. *Understanding Public Policy, 12th ed.* Upper Saddle River, NJ: Pearson prentice Hall, 2008.

Eastland, Kevin M. *Has the Expeditionary Mobility Task Force Organization Outlived Its Usefullness?* Graduate Research Project, AFIT/IMO/ENS/08-06. School of Engineering and Management, Air Force Institute of Technology (AU), Wright-Patterson AFB, OH, June 2008.

Erffmeyer, Robert C., Elizabeth S. Erffmeyer and Irving M. Lane. "The Delphi Technique: An Empirical Evaluation of the Optimal Number of Rounds," *Group & Organizational Studies (1983-1998),* 11(1-2): 120-128 (Mar-Jun 1986).

Expert Panel. Pilot Staff Manning Survey Questionnaire. Questionnaire Responses. 23 March 2009.

Expert Panel. Pilot Staff Manning Survey Questionnaire, Round 2. Questionnaire Responses. 18 April 2009.

Expert Panel. Pilot Staff Manning Survey Questionnaire, Round 3. Questionnaire Responses. 30 April 2009.

Galway, Lionel A., Richard J. Buddin, Michael R. Thirtle, Peter S.H. Ellis and Judith D. Mele. "Understrength Air Force Officer Career Fields: A Force Management Approach," RAND Research Report, 2005.

Griffis, Stanley E., Thomas J. Goldsby, and Martha L. Cooper. "Web-base and Mail Surveys: A Comparison of Response, Data, and Cost," *Journal of Business Logistics* 24 (2): 237-258 (2008).

Hafer, David. The *Practical Application of Force Development for Today's Mobility Pilot*. Research Report. Air War College, Air University, Maxwell AFB, AL, 17 August 2007.

Headquarters United States Air Force, A3O-AT. "AM History Words." Unpublished memorandum. Washington: HQ USAF, undated. Received via e-mail 6 March 2009a.

-----. "Kickoff Methodology Discussion." Power point presentation, undated. Received via e-mail 27 January 2009.

-----. “Rated Management.” Power point presentation, 29 Oct 2008. Received via e-mail 27 January 2009.

-----. “Rated Management Primer.” Unpublished manual. Washington: HQ USAF, undated. Received via e-mail 3 March 2009b.

-----. “Rated Staff Allocation Plan.” Excel document. Washington: HQ USAF, 9 December 2008a.

-----. “Rated Staff Allocation Plan (RSAP).” Power point briefing. Washington: HQ USAF, 9 December 2008b.

-----. “Rated Staff Requirements IPT JT/HAF/SAF/DRU/FOA Working Group Back-brief.” Power point briefing. Washington: HQ USAF: 25 February 2009.

Helmer, Olaf. “Systematic Use of Expert Opinion.” RAND Corporation, P-3721, Nov 1967.

Helmer, Olaf and Nicholas Rescher. “On the Epistemology of the Inexact Sciences.” RAND Corporation, R-353, Feb 1960.

Huscroft, Joseph R. *Practical Challenges in Managing the Reverse Logistics Process in a Supply Chain*. Auburn University, 15 Nov 2008.

Ingram, C.J. “AMEC_Jun 08.” Power point slide provided via e-mail, 9 March 2009a.

-----. “Aircrew Management.” Power point presentation provided via e-mail, 3 March 2009b.

-----. “So Many Requirements So Few Bodies.” Unpublished, undated power point presentation provided via e-mail, 6 March 2009c.

Kafer, John H. *Relationship of Airline Pilot Demand and Air Force Pilot Retention*. Graduate Research Project, AFIT/GMO/LAL/98J-11. School of Logistics and Acquisition Management, Air Force Institute of Technology (AU), Wright Patterson AFB, OH, June 1998.

Krippendorf, Klaus. *Content Analysis: An Introduction to its Methodology, 2nd ed.* Thousand Oaks, CA, Sage Publications, 2004.

Lang, Trudi. “An Overview of Four Future Methodologies.” Occasional Paper 7, *The Minoa Journal* (August 1995). Accessed on-line 3 Mar 2009. http://www.futures.hawaii.edu/jrnls.html

Linstone, Harold A. and Murray Turoff, eds. *The Delphi Method. Techniques and Applications,* 2002.

Ogden, Jeffrey A., Kenneth J. Petersen, Joseph R. Carter and Robert M. Monczka. "Supply Management Strategies for the Future: A Delphi Study," *The Journal of Supply Chain Management* 41(3): 29-48 (Summer 2005).

Okoli, Chitu, and Suzanne D. Pawlowski. "The Delphi Method as a Research Tool: An Example, Design Considerations and Applications," *Information & Management* 42 (2004) 15-29.

Owens, Douglas H. ASAM class briefing, 13th Air Force Visit. 11 May 2009.

Piel, James W. *A Vision for Air Force Special Operations MQ-1 Predator Unmanned Aerial Vehicle Operations*. Graduate Research Project, AU/ACSC/8526/AY06. Air Command and Staff College, Air University, Maxwell AFB, AL, April 2006.

RAND Project Air Force. "Rated Staff Requirements Project." Power point briefing. 13 January 2009.

Randolph, Monique. "Changes on the Horizon for Air Force Pilots." Accessed online: 4 February 2009. http://www.af.mil/news/story.asp?storyID=123054831 (posted 29 May 2007)

Schmidt, Roy C. "Managing Delphi Surveys Using Nonparametric Statistical Techniques," *Decision Sciences.* (28)3: 763-774 (Summer 1997).

Therrien, Kevin C. *Balanced Pilot Production in the United States Air Force.* MS thesis, Department of Industrial Engineering, University of Arkansas, December 2005.

Thie, Harry J. "Creating a Pilot Corps for the 21st Century." Accessed online: 4 February 2009. http://www.rand.org/pubs/research_briefs/RB7508/index1.html

Thie, Harry J. and William W. Taylor, Claire Mitchell Levy, Clifford M. Craf II, and Sheila Nataraj Kirby. "A Critical Assessment of Total Force Pilot Requirements, Management, and Training." Documented Briefing, RAND, 1994.

Turner, Doyle, C. *Refining the Utilization of Air Force Personnel in the 21st Century*. Graduate Research Project, AU/ACSC/NNN/2006-04, Air Command and Staff College, Air University, Maxwell AFB. AL, April 2006.

Wylie, Alexander M. *Optimization of Rated Officer Staff Assignments*. Graduate Research Project, AFIT/IOA/ENS/07-03. School of Engineering and Management, Air Force Institute of Technology (AU), Wright Patterson AFB, OH, June 2007.

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14. ABSTRACT In this study 23 MAJCOM/FOA rated management experts were surveyed. In a three round Delphi Study, the expert panel determined a list of unique pilot knowledge, skills, and abilities (KSAs) and staff issues that benefited from those KSAs. The value of this study is that it highlights a conundrum in pilot manning that is exacerbated by current trends in budget and manning reductions. Traditionally, the AF wants and needs pilots in some staff positions because of unique KSAs, and in other positions to develop future leaders. Currently, the Air Force can no longer afford to fill even the most essential positions, much less those positions which further career development, and meet increasing operational requirements. The impact of this study is that it underscores the importance of a concrete understanding of pilot staff requirements and supports a requirements review of all 3,005 pilot staff positions. It also demonstrates that the Air Force should discuss what it expects future leaders to look like. Are pilots part of the future leadership of the Air Force or not? If so, how will anticipated staff reductions affect force development? While this study does not make recommendations for specific staff reductions, it does address a critical supply/demand issue (for pilots, specifically on staff) from a demand-side perspective where most past efforts have concentrated on the supply side of the equation.

15. SUBJECT TERMS

Rated Management, Pilot Staff Manning, Delphi Method, Personnel Supply/Demand

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